CHAPTER 9
SUMMARY AND CONCLUSIONS

9.1 Introduction

The present research work aims at documenting the evidence about the efficiency of Indian commodity derivative market. While tackling this issue, the attempt has been made to address the issue of price discovery and hedging effectiveness in totality because derivative securities have come into existence to deal with price volatility. Therefore, the study has been undertaken with an objective to find the stylized facts of volatility and the impact of flow of information on volatility dynamics. The three aspects of derivative market i.e. market efficiency and unbiasedness, price discovery, and hedging which have been focused for understanding the effectiveness of commodity derivatives have been well researched in the context of other countries but a limited study has been done in the context of India. Alongside the attempt has also been made to gather the perception of key market players with regard to the derivative market activity, usage, and efficiency of these securities. It is essential to investigate these issues because although the derivatives in commodities have been in existence for centuries in some form or the other but still there is a large section of investors who have refrained from using them so far.

In the concluding chapter, an attempt has been made to summarize the research work by highlighting the key findings, major learnings, significant research contribution, limitations, and scope of the future study.

9.2 Major recommendations and learnings

This section attempts to document the summary of key findings and learnings during the course of this research work. First of all, the key findings are presented in three major categories:

9.2.1 Stylized facts of volatility and the impact of flow of information on volatility dynamics

1. The present research clearly indicates the fact that the stylized facts of volatility and volatility dynamics are an important issue in the entire gamut of commodity derivative and deserve special attention of market participants.

2. Based on research findings, it can be concluded that there is the presence of persistence, mean reversion and leverage effect in Indian commodity derivative market.

3. The relationship between flow of information on volatility dynamics is measured by augmented EGARCH models. The flow of information is proxied by volume and open
interest. It has been found that trade volume adds significant explanatory power to reduce the GARCH impact whereas the return showing the asymmetric response towards good or bad news. However, open interest fails to show any significant information content in Indian commodity derivative market. Contemporaneous volume is showing significant coefficient values than lagged volume.

4. Contrary to the popular perception, the research findings further clarified the absence of time to maturity effect in Indian commodity futures market.

5. The research findings have further validated by replicating the statistical tests with commodity Indices. The results are clearly supporting the evidence of individual commodities.

9.2.2 Market efficiency, price discovery and hedging effectiveness

6. It is beyond doubt that derivative securities have changed the market scenario in India in past years. A section of investors has discovered new trading tools that facilitate risk taking, risk shedding and execution of complex trading strategies among others.

7. On the one hand, the evidence from international arena is mixed about the efficiency and effectiveness of derivative securities. On the other, the evidence of Indian market is extremely limited because of high government regulations on commodity trading before 2003. After 2003, India commodity derivative market has registered its presence on the global arena. However, it is beyond doubt that these securities may prove to be extremely lethal in case they are not handled properly. The well-known stories of derivative disasters remind the potentially harmful effects of these securities.

8. While analyzing empirically the long term efficiency and unbiasedness of commodity derivatives, it has been found that no individual commodity futures and commodity Indices are showing the sign of long-term efficiency and unbiasedness and in the short term, futures prices are effective enough to discover the spot prices.

9. The evidence on price discovery aspect of derivative trading is quite encouraging. It has been evident that commodity futures are playing a significant role in improving the informational efficiency of the underlying asset market. The findings have remained largely same whenever this issue has been examined with different diagnostic tools or for different commodities futures or Indices. Therefore, it would be fair to claim that derivative
market has improved the quality of underlying commodity market. This finding is in line with a number of other research findings in international context.

10. Comparative analysis of hedging effectiveness of near-month and next to near-month futures show that hedge effectiveness calculated from VECM-MGARCH (1,1) is higher than VECM for Castor seeds, Copper, and precious metals. In the case of optimal hedge ratio estimation, VECM gives higher hedging effectiveness and provides greater variance reduction than OLS and VAR.

9.2.3 Market response

11. The survey of commodity derivative market participants also supplemented some of the earlier findings. The derivative market is growing in size, reach, and participation. It is a positive development and reflects well on the market system.

12. The survey has also hinted towards some of the adverse aspects of the derivative market functioning. There is a high degree of concentration of derivative positions among the market participants. This may pose a threat to the stability of the entire commodity market because derivative and spot market are highly interlinked.

13. There is some evidence of using derivatives for speculations purpose. Mainly, the commodity futures are being perceived as tool for speculation because they are highly leverage securities and the market player may look at them as an alternative to badla system. These contracts have been looked at with suspicion all over the world despite the fact that they are the most popular among the lot in the Indian market.

14. The present research also highlights some important areas of concern among investors. A whole host of reasons may be attributed to the non-investment in these contracts that includes complex valuation, volatility and lack of understanding among the masses. The international experiences are almost contrary to it.

15. The results from the brokers’ response have given further validation to the empirical results of volatility dynamics, market efficiency, price discovery and hedging effectiveness.

16. Lastly, this study calls for rigorous efforts on the part of market regulator, players, service providers and other stakeholders in order to ensure the smooth functioning of commodity market. The first and foremost must be about the settlement of commodity futures which should be done on the delivery basis. This issue has remained in the domain of expert committees’ discussions but some concrete action is urgently required.
9.3 Significant research contributions

The present research has significantly contributed to the different spheres of commodity derivative market functioning. The contribution is divided into three broad categories for better assimilation of issues concerning the market.

9.3.1 Contribution at conceptual level

At the conceptual level, the existing research has contributed in the following manner:

1. Conceptual framework for understanding the stylized facts of volatility and analyzing the impact of the flow of information on volatility dynamics.
2. Conceptual framework for the understanding of long-term market efficiency and unbiasedness.
3. Conceptual framework for analyzing the price discovery and measuring the hedging effectiveness of commodity derivatives.

9.3.2 Contribution at empirical level

This study has significantly contributed at the empirical level as given under:

1. Exploring the select econometric techniques suitable for the Indian commodity derivative market out of a large number of techniques.
2. Research evidence of the presence of stylized facts of volatility in Indian commodity market and the impact of the flow of information on volatility dynamics.
3. Research evidence on the market efficiency, price discovery and hedging effectiveness of Indian commodity derivative market.
4. Documentation of the market perception about the derivative securities that is still in nascent stage.

9.3.3 Contribution at methodological level

The contribution of this study at methodological level is as follows:

1. Application of different time series techniques.
2. Application of Eviews program to suit the existing techniques in the Indian scenario.
3. Application of both individual commodity futures and commodity Indices data for measuring the efficiency of commodity derivative.

9.4 Limitations

Although the present research has significantly contributed to different levels as mentioned in the previous section, it has certain limitations that are as follows:
1. A number of assumptions have been made with regard to the distribution of return series on the basis of available literature without exploring its applicability.

2. As the time lag between the introduction of different commodity derivative futures is narrow, it is difficult to separate the impact of an individual commodity derivative security over the respective underlying asset.

3. The intra-day data could not be used for the study because of its unavailability.

4. As the derivative market is not so liquid, there were a number of proxies that were taken to fill the gap e.g. market information is proxied by volume and open interest.

9.5 Scope for future research

There are a number of areas that are still unexplored and this study at least ignited the thoughts in that direction:

1. The study may be undertaken in future after incorporating intra-day data for the sample period.

2. There are still some areas left that need to be examined including pricing and forecasting.

3. The insignificant relationship between open interest and futures volatility poses the question about the motive behind the trading activities. A further research is required to answer these questions.

4. Further studies can be conducted by using the control sample that may provide additional support for the results obtained here.

5. The survey may result in more meaningful outcome if the sample for respondents is expanded to whole Indian brokers and questionnaire extends to more specific individual commodities.

There are a plethora of issues that warrant empirical examination and future research studies would probably address the issues being identified by this research.

9.6 Concluding observations

The derivative securities are extremely important for any market player dealing in the commodity market. They provide a meaningful mechanism to shed some part of the risk involved in the underlying asset market. After significant changes in commodity derivatives in the year 2003, this market has surpassed the spot market in terms of trading volume. A moderate attempt has been made though this research study to document the evidence of efficiency in terms of price discovery and hedging effectiveness of commodity derivatives. In the similar fashion, it was felt
appropriate to select a framework that measures the relationship between volatility and information arrival.

In the first objective of the study, presence of stylized facts in Indian commodity market has been empirically found which make it clear that these general properties can be reproduced with a model. In the second objective by using the augmented EGARCH model with exogenous variables, impact on the persistence and asymmetricity of the volatility is studied. The findings suggest that contemporaneous volume reduces the volatility persistence more than lagged volume. However, the GARCH effect does not vanish completely. Open interest as the exogenous variable does not reduce the volatility; however when integrated with volume significantly impact the persistence and asymmetricity. It was found that Samuelson maturity hypothesis does not hold true in Indian commodity futures. With regard to the impact of commodity futures on price discovery and hedging effectiveness in third and fourth objectives of the study, the results are by and large in line with the international experiences. The empirical evidence of the presence of informational efficiency in the futures market in the third objective has suggested that futures prices play the role of leader and transmit the information to the spot market. The restrictions on cointegration parameters for all the commodities establishes the presence of long-term inefficiency and biasedness in Indian commodity market. A comparative analysis of static and dynamic hedge ratio in the fourth objective reveals that VECM and VECM-MGARCH hedge ratio performs better and precious metals are the most effective hedging futures.

Lastly, the survey findings have provided the useful inputs in relation to the perception of brokers about the commodity futures, their usage and hedging efficiency which support the empirical evidence of preceding objectives. The present study has been conducted using carefully drafted using scientific approach because of its importance for brokers, investors, fund managers and regulatory authorities.